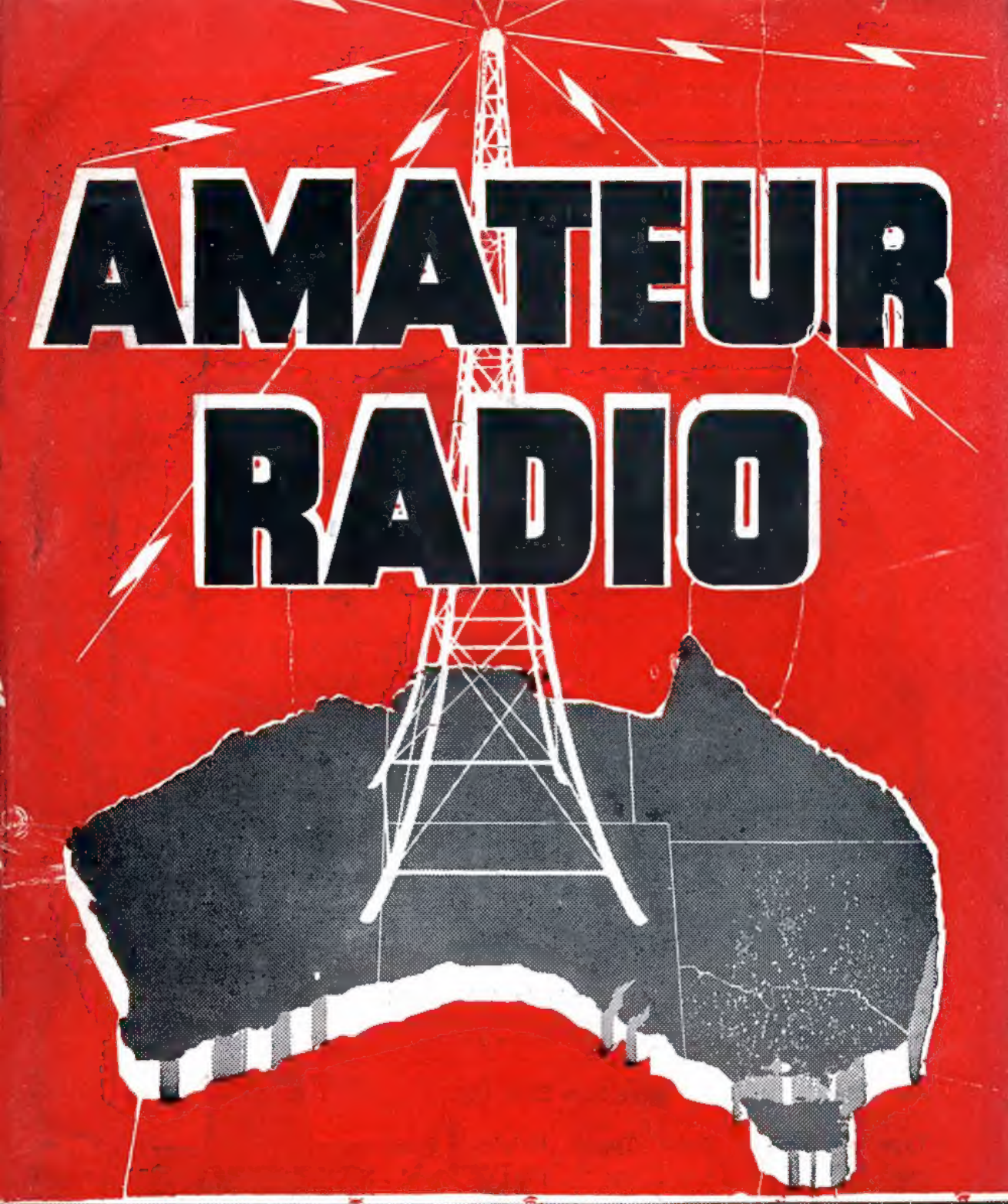
AMATEUR RADIO



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AUGUST, 1937

AMATEUR RADIO

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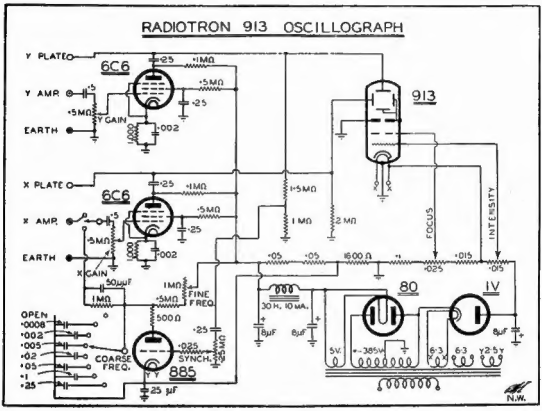

The Radiotron 913 is a Low Voltage Electrostatic type with one inch medium persistence screen for oscillograph use.

It is simple to operate and provides information by visual means that would otherwise need extremely involved mathematical calculations.

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RADIOTRONS

Editorial

From time to time we hear outbursts from various hams on some phase of the ham "Game" with which they don't agree. The energy and violence of their outburst sometimes would do credit to a public man fighting for a Country's freedom rather than a ham voicing a protest at a detail of his hobby which he is not in agreement. We sometimes wonder whether we have lost our sense of proportion to our Hobby for Ham Radio is only our Hobby albeit the best one of them all. None of our Natures are alike, none of us want quite the same out of "the Game," but being human all of us want it made just our way. If he had not lived nine centuries too early Omar Khayyam might have described our attitude when he said:

". . .this sorry scheme of things entire,
Would not we shatter it to bits and then
Remould it nearer to the hearts desire."

It is strange how paradoxical human nature can be. A ham can experience the finest comradeship imaginable will put his best into the design of his station equipment, will be extremely proud of his hobby and yet should he be QRM-ed by a phone man, if he be keen on CW, by a QRO man if he be on QRP by the "young squirt" around the corner, if he thinks he has graduated from that stage, he rants and raves of inefficiency, of selfishness, of stupidity and of "lids." Allowing there is a small, a very small, minority in Ham Radio as in every other walk of life which is grossly selfish and unreasonable, is it sane or logical to label the greater portion of the majority by the same tag? Ask a Ham who has an appreciation of his hobby and who perhaps has often spoken of the spirit of comradeship that exists, if he genuinely believes that the interference caused is either deliberate or done knowingly with a 'dont care' attitude. We will warrant 90 per cent will reply, after consideration that neither category fits any except that very small minority. It is thoughtlessness that is at the back of the trouble and surely thoughtlessness is amenable to reason.

The Vigilance Committee exists and has the necessary authority to deal with that minority and the Committee and the WIA itself can reduce the number of thoughtless acts by a kindly co-operation. But surely it can be cleaned up completely by a concious spirit of co-operation and restraint by each and every individual ham. Some hams talk of further restrictions to curb this and that form of trouble. More restrictions! Haven't we got sufficient restriction now? We grudgingly admitted that some form was necessary to curb that minority we have spoken of, but to talk of further restriction is surely the sternest indictment possible of our utter incapability to control our own activities and those of our fellow hams. (Perhaps we feel that only the other fellow is at fault.) What does our membership of the WIA mean to us if we cannot use it for this purpose? The organisation is maintained so surely this is a logical use to which it may be put. We hear mention of the phone activities of some States interfering with the DX activities of others at certain periods. Do we ever hear of any correspondence on the subject asking for co-operation to clear up the trouble? No! Rather we hear that those who complain have written to the department on the subject. Why maintain an organisation if we are not going to use it as the mouthpiece of the Ham movement?

It is about time we asked each other if it isn't possible for us to use the same intelligence in our ham lives as we have to use in the bigger job of life itself. Should the reverse be the case we would find ourselves bankrupt in an incredibly short space of time. Let us remember this, ham radio is our hobby. It should be a relaxation from our ordinary lives and Heaven knows we need some relaxation from them, they contain enough troubles of their own. But if some of you want your ham radio run like the Taxation Department say so, in order that we may take up some other hobby in despair. As W3BTQ recently said, "Why not try Astronomy, we can all look at once without bothering each other."

The Theory and Application of Automatic Volume Control

By VK6KN.

The average experimenter of to-day does not appear to have a very clear conception as to the meaning of automatic volume control as it is called, perhaps the first thing to do towards accomplishing the object of this article is to change the name of the subject under discussion and call it automatic gain control.

First of all let us consider the theory of operation and then some practical circuits concluding with methods of application to receivers. There is no doubt that A. G. C. was introduced by engineers as a result of the success experienced with the variable-mu r.f. pentode which first came on the market in the form of the 235, the purpose of which was to eliminate cross modulation in receivers, a fault prevalent with jobs using the 224A. A. G. C. is invariably accomplished by the use of a diode. All Hams should be familiar with diode rectification principles or at least with the one that states that if the diode plate is positive with respect to the cathode a stream of electrons will flow from cathode to plate resulting in a current through the circuit and voltage drop across the diode load resistor. The function of the device which we are considering is to maintain the output of the final intermediate amplifier stage constant in spite of varying input voltages from the aerial to the first R.F. amplifier This results in a steady audio output voltage to the speaker and prevents blasting of strong stations and the fading of distant stations.

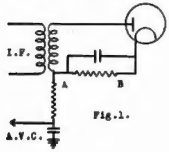


Fig.1.

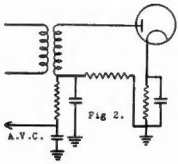


Fig 2.

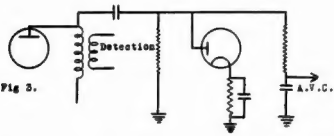


Fig 3.

Let us consider the circuit in Fig 1. This is very simple but will serve to illustrate the principle, the R.F, transformer is the final i.f. transformer in the system and the fluctuating voltage is applied to the diode as shown. When the wave is positive at the plate end a current flows through the circuit and a voltage drop results across the diode load resistor. The important point to note is that the point "A" on the resistor is negative with respect to point "B" or cathode. Now the amplification factor of the variable mu tube re-

ferred to previously depends on the value of grid bias applied, the greater the bias in a negative sense the less the amplification of the tube, so from this we see that if we can obtain a voltage negative in respect to cathode and proportional in amplitude to the amplitude of an alternation of the amplified signal wave then we have a method of controlling the amplification of the high frequency amplifier and so maintaining its output constant. It will be seen that this negative voltage is available from the diode load resistor at point "A" and

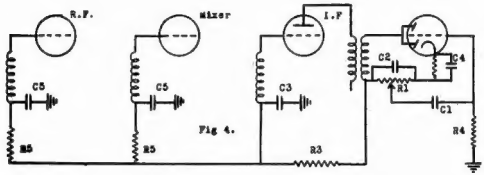


Fig 4.

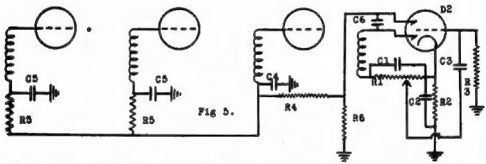


Fig 5.

this is transferred through a filter to the grids to be controlled. The purpose of this filter may seem rather obsecure at first, but it is necessary to prevent the controlling voltage from varying at audio frequencies. The voltage drop is dependent on the degree of modulation of the carrier and if the filter was not used the controlling voltage would tend to smooth out the modulation envelope at audio frequency. The A. G. C. voltage is taken from the condenser which acts as a reservoir. It should not be necessary to point out that the diode rectifies, and the current through the diode circuit is D.C. The system outlined above serves to illustrate the action of A. G. C. but if used would offer some attenuation to weak signals this is obviously not desired, so that corrective measures must be incorporated and this is done by preventing the A. G. C. from working until so desired. How can this be done? Let us go back a bit and it will be remembered that the controlling voltage is only in existance when the diode plate is positive with respect to cathode, therefore, if we can raise the potential of the cathode above earth and take the diode load resistor return to earth then we have a method of delaying the action of the A.G.C. Suppose for example that the cathode is four volts above earth potential then a signal below four volts will not make the plate positive and consequently no voltage will result across the diode load. A circuit of this type is shown in Fig 2. Certain engineers couple the diode to the plate of the final I.F. tube through a condenser of about 100 mmfd. as shown in Fig 3. instead of the usual method diagrammed in Fig 4. which shows a complete practical circuit of an A. V. C. system and brings us to the second part of this article.

To obtain a clear conception of what happens let us consider the function and approximate value of each part in the circuit in Fig 4.

The valve used is usually of the multiple type such as the 6B7 or 75 having included in it another set of elements used for amplification, however, at present we are only concerned with the diode section. The resistor R1 is the diode load resistor and has a value of about half a megohm and as the diodes are also used for detection in Fig 4. it is usual to employ a potentiometer the moving arm being capable of tapping off any required amount of rectified audio voltage and transferring it to the audio amplifier through a condenser of .01 capacitance shown as C1. The condenser C2 is the r.f. return path and has a value of from 100 mmfd to 500 mmfd. The combination R3 C3 is the filter referred to previously the size is usually between 1 and 2 megohms the condenser being about .05 mfd. The combination R2 C4 is the usual cathode bias network the value of the condenser is 10 mfd, small electrolytics being obtainable, the resistor naturally suits the tube in use. The combinations R5 C5 are isolating resistors and r.f. return condensers and are 100,000 ohm and .1 mfd respectively.

Now let us consider Fig 5 ,the diode D1 is used for detection and the components R1 C1, are the load factors of the detection circuit but we will not consider these here. The diode D2 is used for A.V.C. and is coupled to the r.f. circuit through a condenser of 100 mmfd shown as C6. the diode load resistor for D2 is R6 and has the usual value of between 1 and 2 megohms while the combination R4 C4 is the filter the purpose of which is now familiar to you. This circuit is more modern than that in Fig 4. and can be fitted to any set providing the amount of R.F. amplification is sufficient.

Much further can be written on the subject of A.V.C. but enough has been said to enable the reader to sensibly follow any other articles on this subject which appear in advanced technical journals and also to fit A.V.C. to his own super.

WORKED ALL STATES (W.A.S.) AWARDS.

In keeping with the policy adopted at the 1937 Federal Convention; it was decided to award to stations producing suitable evidence a Worked All States (W.A.S.) Certificate. These certificates are now available and your cards should be sent to your divisional Secretary.

The award is no sinecure and takes some winning and shows that the Applicant has all band experience. Contacts may be on either phone or C.W. Contacts on any four bands are suitable either 10, 20, 40, 80 MX; or 20, 40, 80 and 160 MX and so on. The same stations may be contacted on all bands.

The rules are as follows:—

1. Applicants must be financial members of the W.I.A.
2. The following are considered as states, VK2, VK3, VK4, VK5, VK6, VK7, VK8 and VK9.
3. QSL cards must show clearly that any six states has been worked on each of any four bands.
4. The 24 cards must be forwarded to the Divisional Secretary for perusal and he will notify F.H.Q. of the decision of his council on the suitability of the presented cards. On the receipt of this advice F.H.Q. will mail direct to the applicant the Certificate.

The Perfect Station

Part 3.

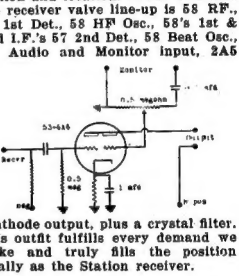
By Vaughan Marshall, VK3UK.

Having examined the "Perfect" Station problem from the antenna and transmitter angles and suggested one solution for each, we now turn to the receiver/monitor section. We have coupled these two together for the obvious reasons that as the transmitted signal must be monitored and provision for break-in operation is essential both units must function smoothly together.

The points that will require most attention in the receiver are Stability, Sensitivity and Selectivity. It has been said that a TRF, the "Super Gainer" and a full Super form the three progressive stages in the design of the station receiver. Whether that statement is correct or not depends first of all on how great are the demands made on the receiver and secondly how much we can afford to spend on it. There is no doubt of this however, that the greater part of the pleasure associated with operating a station is inevitably tied up with the receiver because, whilst an efficient transmitter and antenna will reflect their efficiency in results, there is a tangible, immediate and always present appreciation of a good receiver.

It is our earnest belief that, for city use at any rate, the objective should be towards a Super, if the maximum pleasure from the listening side of ham radio is to be derived. The beauty of it is that we can add stages as time, and more important, finance permits giving progressive advances towards the ultimate design Two factors are essential to successfully carry out this idea, firstly to carefully plan the finished design at the start, so that the addition of a stage does not require the moving of any existing components and secondly to have the strength of purpose to stick to that design, because it is so easy to be lead down the "byways" by introducing trick features not suitable for the general design.

It is not within the scope of this series of articles to describe any particular receiver but we suggest, in designing the station receiver, to build an outfit, in stages if necessary, whose ultimate form will give the maximum possible sensitivity, stability and selectivity required for the particular station and location. In our own case the receiver valve line-up is 58 RF., 57 1st Det., 58 HF Osc., 58's 1st & 2nd I.F.'s 57 2nd Det., 58 Beat Osc., 53 Audio and Monitor input, 2A5



penthode output, plus a crystal filter. This outfit fulfills every demand we make and truly fills the position ideally as the Station receiver.

There are a few points worthy of mention regarding the manner in which its design fits in with the requirements of the station as a whole. No provision is made for Band switching because of the complications introduced by endeavoring to switch four sets of coils, to say nothing of the bulkiness of such a coil assembly The use of plug in coils does not impair our rapid band change requirement in the least. In a contest, which is the only time that seconds are at a premium in the matter of band changing, the flip of the transmitter switch throws it to the desired band and whilst we are calling CQ we have ample time to change coils with the other hand. The monitor signal is available all the time, as will be explained, and as the coil change

takes on the average 16 seconds and the "5 times 3" CQ call about 65 seconds all is in readiness when the call is concluded. It is considered bad practice to call on a band without first listening there, but it is good to know that this method is available if it is ever required.

A worthwhile aid to this procedure is to adjust the four sets of coils so that the bands will fall within the compass of the main tuning dial at the same dial readings of the Band Setting condensers, Thus the only action necessary when the coils for a different band are plugged in is to "trim" the RF control and tune in the normal way.

As no switch is touched on the transmitter while operating on any one band it is desirable to obviate the use of any switch from receiver to monitor. Break-in demands this also. Naturally then either the receiver audio channel must be used or else "split" phones or a combination of phones and speaker. The following method is the best we have tried as there is no switch to be handled, no de-tuning effect on the receiver and the monitor signal level can be adjusted to that of the incoming signal if desired. The monitor has its output fed through a 500,000 ohm variable resistor to one grid of a 53 twin triode. The receiver output from the 2nd Detector plate is fed to the other grid and the two 53 plates, joined go to the 2A5 penthode output valve.

This monitor combines the purpose of Frequency meter also and is a replica of the one described in the Handbook using a 24A Electron Coupled Oscillator feeding a 27. Admittedly it is not a precision instrument but then it is not intended for that purpose any more than the RF thermocouples in the antenna circuit of the transmitter are intended to tell the power radiated. It is completely adequate for normal station requirements and in any case as we have yet to discover a "precision" dial at a price within reach of a normal pocket, it seems a trifle futile to build what would be intended as a super-accurate meter and put on it a dial that can only be read to, say a quarter of a division.

Recapitulating we can say that each of the sections that make up the complete station has been designed in relation each to the others in the endeavor to make the whole a smoothly functioning unit. A card above the receiver gives the logged dial readings for each crystal in the transmitter and also the receiver tuning dial is calibrated for each band.

No switches need be touched while the station is on the air, break-in is smooth, band change is efficient, monitoring is automatic, in short we are able to obtain the greatest pleasure possible through the convenience of merely having to key and listen during a QSO.

A little careful consideration of the points we have discussed in these articles will be found well worth while and whilst the solution to each must be arrived at with due regard to the personal needs of the individual operator, the results will repay the time, yes and the money, spent on what will be regarded as the permanent station equipment.

TRANSMISSION SCHEDULES.

AUGUST, 1937.

VK2ME, SYDNEY.

Sydney Time	G.M.T.
Sundays.	
3 p.m.—5 p.m.	0500—0700
7.30 p.m.—11.30 p.m.	0930—1330
Mondays.	
1.30 a.m.—3.30 a.m.	1530—1730

VK3ME, Melbourne

Melbourne Time	G.M.T.
7 p.m.—10 p.m.	0900—1200

Nightly Monday to Saturday (inclusive)

VK6ME, PERTH.

Wavelength 31.28 metres (9590 Kc/s.)

Perth Time	G.M.T.
7 p.m.—9 p.m.	1100—1300

Nightly Monday to Saturday (inclusive)

Multiple Unit Antenna

Some Thoughts on Dimensions.

by E. H. Cox, VK2GU.

Casual conversations over the last few months with a number of people who claim only moderate success with multiple element antennas seem to indicate that the process of determining the dimensions of the units in such radiating systems is still not so clearly understood as it should be if their opotential performance is to be fully realised. The following notes are intended, accordingly, to recapitulate the principles involved in determining the length of radiating units in antennas employing more than one simple dipole.

Not so long ago, it was possible to do oneself fair credit at the exam for the AOPC by asserting that the ordinary dipole dimensions were made a little short of the physical half wave length to compensate for "proximity effects"—the loading of capacity to earth, capacity to masts, guys, halyards and other adjacent objects upon the antenna wire, and also, for the fact that the velocity of a wave upon a wire appeared to be a little less than the velocity in free space. The correction factor K, quoted in the Handbook and elsewhere, and varying between about .96 and .94 up the amateur spectrum provides an admirably accurate method of determining the length of wire to be used when the antenna is to be a half wave radiator. But the fact has recently emerged that the picture is not quite so simple as this summary makes it appear. If the half wave wire has no ends, it is in fact, not forshortened for resonance by the amount which the factor K demands, but it actually remains a physical half wave long. The forshortening effect, then is intimately associated with the ends of the antenna, and it is coming to be given the name "end effect" which appears to be considerably more appropriate than the more familiar term "proximity effect."

A dipole "without ends" is very common in amateur practice. A 40 metre dipole operated on its second harmonic is equivalent to two dipoles being operated 180 deg out of phase on 20 metres. But in it, there are only two ends for the two dipoles instead of the four they should ordinarily have. Thus the antenna virtually contains one dipole without physical ends. Suppose now that on 40 metres, the antenna has been cut precisely to the frequency of a crystal on exactly 7,000 KC. The antenna length will be less than half a wave long by almost exactly 3 ft 6 ins. and its length will be about 66 ft 9 ins. Bearing in mind the real significence of the end effect, it is obvious that for resonance at the second harmonic of the same crystal, the antenna would require to have a length equal to 95 per of a half wave for that half wave which has ends, plus a physical half wave for the dipole without ends. The necessary length for resonance with the second harmonic of the crystal according to this reckoning comes out at about 68 ft. 6ins. Our antenna, then is about 21 inches too short to hit resonance with the crystal on its second harmonic. Using a 40 metre zepp fed wire on its second harmonic, this error, perhaps, would not be very serious, but it cannot be disregarded even in a simple system like this if a higher harmonic than the second is chosen. For instance, a wire cut to resonate on 3.5 Mc would be about five feet too short to strike resonance with the fourth harmonic of the 3.5 Mc crystal. Twenty metre operation on a 3.5 Mc antenna is not uncommon, and the fact is accordingly worth remembering if the feeders refuse to balance properly when working them at the fourth harmonic of the crystal frequency for which the antenna was cut.

To clear the air, let us point out that from what has already been stated, the following formula for determining the length of an antenna

to be operated at harmonics of its fundamental frequency can easily be deduced.

$$\text{Lgth in ft} = \frac{(N—1 + K) \times 492}{F} \quad (1)$$

where N is the number of half waves on the wire, K the end effect correction factor for the frequency used, and F the frequency of resonance in megacycles K is .96 for frequencies lower than 3 Mc .95 for frequencies between 3 and 30 mc, and .94 for frequencies above 30 mc. Rough justice will usually be done if the mean value for K (namely .95) is taken as a working basis for all bands and antenna lengths can be calculated with tolerable error by simplifying the formula accordingly to

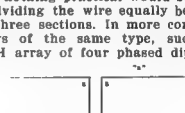
$$L = \frac{(N—.5) \times 492}{F} \quad (2)$$

The fortunate soul who has the space to put up a V beam five wave lengths on a side will quickly appreciate the formula. If designed for 14 mc exactly the length per side would work out at 348 ft, but if calculated on the assumption, so often made, the every half wave should be shortened to compensate for proximity effects, the length would appear to be only about 334 ft. And, in the latter case, the builder would probably wonder why the apex of the beam insisted on harbouring a voltage node, when a loop was expected.

So few of us have broad acres at our command that the case just cited may be regarded as a little remote. Nevertheless, the effect is equally important in the case of the ever more popular arrangements of phased dipoles, such as the two half waves in phase, end to end, and the even more effective "H" array of four half waves in phase. This is particularly so when a matched impedance line is used to feed the system. When Zepp feed is used, approximate resonance can be achieved even when the antenna elements are considerably off resonance by balancing errors on the line tuner and the Zepp system has so many losses in any case, that the extra loss due to forced resonance is not greatly noticed. But if the system is fed by a matched impedance line it will in no circumstances draw power properly if more than a very small amount off true resonance and even then the line becomes an enthusiastic partner in the business of radiating power.

Consider first the case of two half waves in phase, joined by an impedance matching and phasing stub and intended as a broadside radiator.

(Fig 1). Here virtually, we have a single wire operated at its third harmonic—three half wave antennas with only two ends between them. The length can readily be calculated by the formula (2) shown above and it will be accurate. The only difficulty then to be faced is the determination of the length of wire in each of the two radiators a, a, and the length of wire to be reserved for inclusion in the stub (b) In this simple case, nothing practical would be lost by dividing the wire equally betwen the three sections. In more complex arrays of the same type, such as the H array of four phased dipoles,



the same rule of thumb can hardly be followed safely, because of the need for accurately phasing spaced sets of wires. A modification of the above formula is therefor useful to meet such cases. It can readily be evolved by assuming that if a dipole with two open ends is reduced by end effects by an amount equal to .05 of a physical half wave, a dipole with only one open end will be reduced in length by .025 of a physical half wave—that is that it will be 97.5 per cent of a half wave long In fact, the principle of reducing antenna length by 2.5 per cent of a half wave for every end on the antenna provides merely another way of writing the second formula given above.

Applying this principle to the two half waves in phase, the formula for determining the length of each of the Radiators a, a, in fig.1 becomes.

$$L = \frac{.975 \times 492}{F} \quad (3)$$

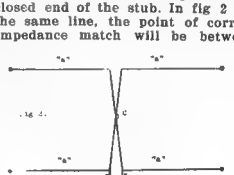
And, since the wire forming the stub has no ends at all, its total length, including that of the cross bar at the bottom of the stub is equal to a full half wave at the frequency used and is determined by the formula:

$$L = \frac{492}{F} \qquad (4)$$

The employment of these two formula for determining the dimensions of the antenna of Fig 1 involves two calculations in place of the one in equation (2) but it has the merit of avoiding any ambiguity regarding the points at which the wire should be folded to form the stub. In the building of the antenna of Fig. 2, equations (3) + (4) are of much greater value. Here the important dimensions are the lengths of each of the four radiators a, the length of the matching stub (b) and the length of each of the two wires in the combined phasing and transmission system c joining the upper to the lower elements.

The "H" array has four open ends, and the length of each of the elements a is accordingly calculated by solving equation (3) for the frequency to be used. The matching stub B has no end effects to be compensated for, and the total length of wire required is accordingly given by equation (4). Similarly, each of the wires in c is a dipole without ends, and the length of each wire forming c will be a full half wave as determined by (4). It is to be noted that the total length of wire in b is only a half wave—that is b will hang one quarter of a wave below the bottom dipoles, while the total length of c, or the length of each of the wires forming that section, is a full half wave. In addition to ensuring that the antenna will tune accurately to the frequency for which it was intended the use of formulas (3) and (4) for determining the length of the elements will ensure that the two bottom radiators are tapped onto the combined phasing sections b and c at exactly the correct point to maintain the four elments exactly in phase and at the exact centre of the voltage loop at that point.

In both diagrams the points x, x represent the points at which a two wire transmission line would be tapped to feed the system. It is worth pointing out, in passing that since the stub in Fig 2 feeds into a system having about half the impedance of that fed by the stub in Fig 1, the ratio of zy to xy in figure 1 will be considerably greater than in figure 2, if the impedance of the transmission line is the same in both cases. In other words, to effect a correct impedance match on the stub of Fig. 2, a 600 ohm line would require to be tapped on considerably further from the closed end of the stub than it would in Fig.1. Generally, it will be found that in such a system as fig. 1, the matching point for a 600 ohm line will be between 20 per cent and 25 per cent of the distance up from the closed end of the stub. In fig 2 for the same line, the point of correct impedance match will be between



35 per cent and 40 per cent of the distance up from the bottom, to the ends of the lower pair of antennas.

The use of the formulae outlined has been illustrated in one or two simple cases. In general, one or more of the last three will be invaluable in designing almost any form of antenna using more than one half wave. The only system in current use in amateur communication which at the moment of writing comes to mind as an exception is a rhombic arrangement correctly terminated by a resistor of appropriate value. And the reason that the rhombic is an exception is that it is not a single wavelength or single band antenna. If it is correctly built and correctly terminated, it will work with high efficiency over a frequency ratio of about two to one not merely on one narrow band and its harmonic, but at any intermediate point. Obviously, when dealing with a radiator as accommo-

dating as this it is impossible to apply a formula to determine the length of its sides to the last half inch, because one is very uncertain at what frequency its efficient operation begins, and at what frequency it ends.

The operation of an antenna at harmonics of the frequency for which it was intended is never wholly satisfactory. In some cases, even harmonic operation is quite impracticable. Nevertheless, in the case of simpler antennas, the efficiency of a system operated at a harmonic can be improved by ensuring that the harmonic frequency chosen is a true harmonic of the antenna length used.

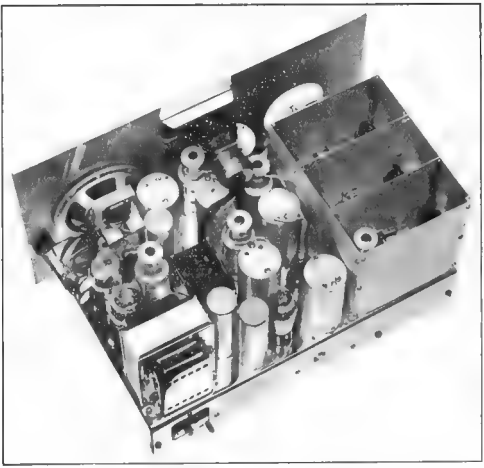
It was pointed out earlier that the 40 metre dipole cut for a 7 mc crystal would be too short for resonance with the second harmonic of the crystal. But resonance could clearly be established by choosing a crystal of higher frequency for operation on 20 metres, and the problem of balancing feeders for the higher frequency band would accordingly be simplified. The frequency required for harmonic operaton of a given antenna can be calculated by re-writing formula (2) as follows

$$F = \frac{(N - .05) \times 492}{L} \qquad (5)$$

In the case cited earlier, L had been worked out for the fundamental of the 7 mc crystal at 66 ft 9 ins. by (5), it is then obvious that the flat top would resonate satisfactorily on the 20 metre band if the original crystal used on 40 metres were replaced by one with a frequency of about 7,185 Kc. followed by an appropriate doubler. It becomes obvious, however, that to apply this principle successfully, the fundamental of the antenna must be fixed very close to the low frequency end of the band, and even then the frequency for most effective harmonic operation will work out fairly close to the high frequency end of the next band.

In conclusion, it is of interest to consider in the light of what has been written, the construction of the familiar end fed zeppelin antenna. Here the whole system of antenna and feeders is resonant, and may be considered as a harmonically excited wire fed at some appropriate point off centre. The whole system, however has only two free ends, one on the antenna and one on the open feeder. It is general practice to make the "flat top" or radiating portion of such an antenna about 95 per cent of a half wave long—that is, to cut it in accordance with equation (2) above. It seems likely, however, that in these circumstances, the flat top would be cut a little short, and that for real resonance equation (3) should be used. It would then follow that the flat top would be 97.5 per cent of a half wave long. But, extending the same argument, it would also seem that the open feeder should be a little shorter than that joining the end of the antenna. The open feeder in fact would appear to require to be 2.5 per cent of a half wave shorter than the feeder joined to the antenna. Such geometrical unbalance should make for better electrical balance, and it would not tend to increase appreciably radiation from the line, as it is well known that the main part of the power radiated from an antenna seems to be emitted from the area about the current loop. There is practically no radiation near a current node, and since current nodes should exist on the ends of a zepp feeder line, the radiation at this point should be negligible. The writer has not had the opportunity to test in practice this aspect of Zepp antenna construction, nor does he know of its discussion. He would accordingly be interested to learn the experiences of anybody who may make a direct experiment.

Amalgamated Wireless Valve Co. Pty. Ltd's 13 Valve "Senior" Amateur Receiver



The 1937 All Band C.W. Test

The Fisk Trophy contest which has been running the last few years, was as you are no doubt aware won outright by VK4 Queensland Division. The discontinuation of this contest would mean the closing of the only Interstate Test, and so under the above name similar in all details. This type of contest will be again held. Certificates will be awarded the winners as under Rule 12.

We would be pleased if you would give the test every support in your division and hope that it will be as well received as last year.

The scoring may be a trifle compicated, so a formula has been arranged which should clear up any misunderstanding.

The grand total score equals:—
(A x B), plus (50C, plus 20D, plus 20E plus 30F plus 100G plus 500H.)

Where A equals number of contacts.
B equals number of States worked.
C equals number of States contacted on 160 MX.
D equals number of States contacted on 80 MX.
E equals number of States contacted on 40 MX.
F equals number of States contacted on 20 MX.
G equals number of States contacted on 10 MX.
H equals number of States contacted on 5 MX.

The above formula will give the score claimed by any station in the contest.

Rules are as follows:—

1. The contest is open to all licensed amateurs, but only members of the Wireless Institute are eligible for either prizes or point score in the C.W. Test.

2. The Times of the contest are as follows:—from 1400 Eastern Standard Time Saturday, 4th September till 2359 E.S.T. Sunday 5th September, and again from 1400 E.S.T. Saturday 11th September till 2359 E.S.T. Sunday, 12th September.

3. The test is of a contact nature, and with each contact, a 10-letter cypher must be exchanged before a point is scored.

4. Stations with which an entrant can work are stations in Australia and New Guinea, outside the competitor's own State. When such a station is contacted and cypher exchanged one point is scored. No exchange, no points scored.

5. Any station can be contacted once on each band each week-end.

6. States are as follows:—VK2, VK3, VK4, VK5, VK6, VK7, VK8, and 9 combined.

7. Licensed power must not be exceeded and infringements of the P.M.G.'s regulations may mean disqualification.

8. One point is scored for each cypher exchanged. The total points are then multiplied by the number of states worked (as defined in Rule 6.)

9. Bonuses will be added to the score after multiplying (Rule 8). The bonuses are as follows:—
Contacts on 160 MX—50 points for each State worked.
Contacts on 80 MX—20 points for each state worked.
Contacts on 40 MX—20 points for each State worked.
Contacts on 20 MX—30 points for each State worked.
Contacts on 10 MX—100 points for each State worked.
Contacts on 5 MX—500 points for each state worked.

The sum of bonuses plus those points scored as in Rule 8 will constitute the grand total score.

10. The cypher to be exchanged consists of 10 letters. The first

five being chosen by the entrant, and to be used as his identifying letters throughout the contest. The remaining five letters are to be the first five letters of the last station contracted. The initial cypher should consist of the five letters of the originating station plus five "A's" i.e. XYZAB—AAAAA.

11. All logs must reach the Federal executive, Box 2127L, G.P.O. Sydney, by the 30th October. The logs must contain: (a) Time, date, and call-sign of each station worked. (b) Cypher sent and received at each contact. (c) Points claimed, contact points and bonus points.
12. Certificates will be awarded to the leading two station in each state and a special certificate to the Australian wide winner.
13. The decision of the Federal Headquarters executive of the W.I.A. will be final and binding in all matters.

Federal and Victorian Q.S.L. Bureau

VK3RJ—QSL Manager.

VK6LY has been elected QSL Manager for VK6 in place of VK6LJ who held the job down for many years.

W2CC well known to VK's is still keeping up his schedules with VK5HG and VK2AP despite changes in QRA. The respective total contacts with these VK stations are 1270 and 220.

By this VK3EO Dave Duff should be enjoying a spell at sea. Dave has preserved his old VK2EO call sign.

The official QSL Bureau for Esthonia is :—E.R.A.U., Box 220. Tallinn, Esthonia.

Cards are distributed only to licensed stations.

Cards for the undermentioned Victorian Stations are on hand:—AD, AQ, AT, AX, BJ, BL, BV, BX, CA, CM, CU, CS, CW, DJ, DQ, DS, EH, EN, ES, EW, FF, FM, FN, FS, FT, GJ, GO, GP, HB, IL, JE, JN, JR, JS, JV, KP, KY, LN, LI, LT, LY, NB, NI, NT, OI, PA, PH, PN, QX, RE, RD, RL, RM, RT, RW, SB, SA, SG, SE, SI, ST, SV, TB, TD, TG, TZ, UN, VK, XA, XG, XK, XU, XZ, YF, YG, ZB, ZF, ZG, ZO Dinan Webb.

Electrical Explorers

PART 2

By W. R. Gronow, VK3WG

Aloysius Galvani, the Italian, found that when a charge from two metal plates was connected to a muscle and nerve in a frog's leg, muscular action took place—more anatomy than electricity about that—thus the term galvanism was used, the word "galvanometers," as indicating instruments, was applied in Galvani's honour.

Alessandro Volta, the Italian, went one better. He made up batteries of dissimilar metal plates, as he claimed the muscular action to be the result of current generated between the plates and not in the muscle and nerve action. So a constant source of electricity came into being. The term Volt is rightly applied in his honour. Numerous experimenters applied this constant source of supply for their experiments — chemistry greatly benefited, water being decomposed into oxygen and hydrogen by this means.

Humphry Davy, the Englishman, improved the batteries by his experiments, and among his many discoveries were listed the arc light, iodine, etc.

Hans Oersted, in Copenhagen, about 1805, discovered that a compass needle was moved at right angles to a wire conductor carrying current, and made many investigations of this type of study.

Andre Ampere conducted numerous experiments with wires carrying current, discovered several important laws relating thereto, worked on the needle and wire idea, and left us his name as the unit of current.

Francois Arago and Humphry Davy both found that if current was passed through a coil of wire it would magnetise a bar of iron in its centre—the electro-magnet was born. They also used steel, and so made permanent magnets.

Professor Ohm, of Germany, gave us the law which all electrical students know is the basis law of electricity, hence the unit of resistance is called an ohm.

Michael Faraday takes the stage at this time, about 1840. You can see how much he had to work on, passed to him by the labours of the pioneers. His strong feature, however, is to be found in the application of the truths as he found them. A knowledge of the difference between electricity and magnetism was now well established, and the various ways of producing electricity were well known. Measuring instruments employing the wire and needle idea gave them the galvano meter, which was later improved by D'Arsonval. But to return to Faraday, poor, uneducated, he became an assistant servant to Sir Humphry Davy, who introduced him to many of the leading experimenters. Faraday was very sincere, and by hard work and study he eventually took his master's place as head of the Royal Society. His discoveries in electricity, as well as chemistry, were notable. He concentrated eventually on electricity following Oersted's discovery about the needle and wire. He developed this idea until he produced a magnet that caused a wire-carrying current to rotate—the electric motor was developed from this revelation. Most of the electrical terms were framed by him, putting the electrical discoveries of his time into precise theory. The law of magnetic induction was his discovery, and so the electric generator was his child. Both the dynamo and magneto added another source of power to the list. He discovered the induction effect in a coil, the transformer, alternating current, the commutator, etc., whilst his thought on atoms and that transmitting medium which we call the ether showed him to be the foremost man of his day.

James Clerk Maxwell, the great Scotch mathematician, about 1870, put the electrical terms and knowledge of these times into mathemati-

cal form, so that electricity came to be more generally understood as possessing definite laws which could be expressed in a mathematical fashion. He showed mathematically that the velocity of propagation of magnetic action was similar to that of light. Following this fact, wave forms came to be related and understood.

Such names as Lord Kelvin and Heinrich Rudolph Hertz now come on the screen, and Hertz soon startled his contemporaries with his theories. About this time, 1870, Morse had invented his telegraph, and Bell had developed the telephone. Hertz started to demonstrate Maxwell's theories of wave motion practically—about 1886. He found that a wire bent to form a rectangle with a small gap between the ends, when connected to a circuit in which an induction coil was placed, that when a spark occurred on the coil interrupter a spark also appeared at the gap on the rectangle. At last the basic idea of a spark transmitter. He further noticed that this happened when the rectangle was only inductively coupled to the induction coil. He showed that resonance was the secret of this action between the circuits. What a discovery! Others had nearly hit on the idea.

Henry, Von Bezold, Hughes did not follow their schemes out, or they might have hit on it before him. Hertz, with his resonator circuit, could now generate waves, and by a resonating circuit tune them in and detect their presence at a distance. We are on the verge of communication at last, and Sir Oliver Lodge was only a step behind him. Hertz showed that these ether waves travelled at the same speed as light, and could be reflected, refracted, diffracted and polarized. His experiments were conducted on wavelengths of 5-6 metres.

Righi and Lebedew went lower still in wave-length to about 1 centimetre. Many other experimenters, such as Cooke and Wheatstone, carried on the search for a communication system by wires, leaving the ether wave idea to be germinated by Marconi.

James Prescott Joule, in England, was at this time (about 1860) working out theories on the conservation of energy, and his name is kept alive by the electrical unit for quantity—the joule. Herman Helmholtz put his ideas into mathematical form, and established them on a proper basis.

Young and Fresnel meanwhile were opening up the knowledge of light waves and explaining their ideas on the substance of the ether. Light waves were used to transmit messages over distance, but the future still held the opportunity, for which all the previous knowledge had prepared the experimenters, and Marconi, by patient work, clear vision, and persistent effort, succeeded at last in effecting communication with Hertzian waves, that long-sought dream of transmission of thought over long distances.

THE WINDBAG CLUB.

Formed by a number of the 80 meter phone gang with the object of assisting one another to improve transmissions and at the same time lessen the QRM—the Windbag Club now numbers eleven members—all Eastern Staters so far.

2JC is President and control station, while positions of committeemen are filled by 2KQ, 3EP, and 4GG. The gang are going on spot frequency 3503 KC and should be heard in full blast by the time this note appears. The rules of the club are worthy of emulation.—

1. Abide by the rules and regs. of the P.M.G. Dept.
2. Never knowingly put the rig on air when out of adjustment and if notified take immediate steps to rectify trouble.
3. Put out best quality phone consistent with equipment and finances at your disposal.
4. Be ready at all times to assist either with advice, standing by etc. any fellow member having trouble with his or her rig.
5. Always give a candid report.
6. Never promise to QSL unless you intend to do so.—3WE.

28 and 56 M.C. Notes

A. Pritchard VK3CP.

Ten Meters! The band has been very changeable these last few weeks —very short skip, giving signals from VK6, ZL, VS and K6 stations r8 for many hours at a time, even past the peak periods—VK2GU's phone is often r7. The Europeans have again faded out, although the day preceeding a run of warm weather, usually brings G6DH in round 7 p.m.

VK3BQ heard YR5YN at 2.15 p.m. on the 8th June; this is the earliest time Europeans have been heard in VK. There is quite a lot of activity in the West. At present VK6LW, 6FO, 6SA, 6AA and 6MW are on consistently. VK6LW is using a 2 stage rig, having a 6F6 Electron coupled osc. from 40 mx, and 6L6G doub. to 10 mx. The ant. is unusual 2 half waves phased with a quarter wave section, one of the antenna fed by a single wire matched impedance feeder. 6LG reports many VK harmonics r8 (unfortunately). VK6SA has 7-'46 type tubes in his 6 stage cw rig—80 mx xtal, and PP final; he is experimenting with various beam antenna. We were surprised to hear VS1AA at r8, cw from 6 till 7 p.m. on Sunday 20th June; he qso'd ZE1JU and received 569x—later qso hr at 3CP; 3BQ and 5LJ wkd him the following Sunday. VS1AA has a xtal on 3508KC using Maxda tubes in the exciter and buffer stages, 100 watts to PP 838's in the final. VS2AK also has fine signals and has qso'd 2GU many times, two way phone. Another two stations in Hawaii are consistent, K6LNP and K6iCL in the former and PP T55 in the latter. The best sigs from the States are W6LOY, W6NGJ, W4EEV and W6CKR (r9). The peak period is aroound mid-day at present. At VK3BQ, Max has been doing some very fine work with a 1 stage 10 mx, 2 stage 5 mx rig. After grinding half a dozen 20 mx xtals and testing them in a tri tet—EL3 or 6L6G—the output was so good that the antenna was hooked on giving r max sigs hr and a 449x contact with 6SA. Adding a 6L6G reg. doub. to 56 mc gave excellent output with T9x sigs; this makes practical very much simplified xtal control on 5 meters. This tri tet also drove the 801 reg. 5 meter doub. here at 3 CP, giving a resonance dip from 100 to 40 mills at 750 volts on the plate. K6LCV is always r9 but is most difficult to contact due to his antiquated receiver. VK3YP has the four half waves in phase—H type, beam finished and the improvement with both the Tx and Rx is astounding. R9 reports from K6LCV and all over the States being received. ZL4AC is using a 20 mx xtal with a 6C5 tube, 807 doub and RK20 final, 60 watts sup. modulated, and is one of the best N.Z. stations. At present there is more activity there than hr in VK. ZL4GM, 4AO, 3KZ, 1FT and 1JD are on regularly giving many fine contacts. ZL1JD has perfect quality phone and reported a qso with VK2TA as late as 8.30 p.m. on the 25th June. 1JD outfit has a 40 mx rock! and PP Taylor t20's in the final modulated by class AB 45's VK3FL was heard clg. 4GM a few weeks back but was not heard since. ZL2FY has an outfit worthy of notice and is yet another version of 28 mc xtal control—2 '42's osc and doub. 6L6G doub. 10 mx PP 210 with 80 watts input. The mod. has a xtal mike, 3-57's pre-amp PP 45 Class A—210's Class B. From Japan J2CF is the only station which has been heard for several months now, although the harmonics near the low frequency end—XQK, XGP, TDC, JNJ and NPO reach r9 levels. Regarding 56 mc dx! W2JCY is one of the most active stns. and desires us to look out for him. He has a ½ kw input and has contacted all w districts except W5 and 6; he has been hrd by G5BY and our old friend G6DH. Our most consistent 56 mc man 3JO is putting out beautifully steady excellent quality phone. VK2GU is still improving his 6 meter, transmitter. Harold is putting in two Eimac 100TH tubes and using the 808's in the Class B mod. Best of luck OM.

Divisional Notes

To ensure insertion all copy must be in the hands of the Editor not later than the 18th of the month preceding publication.

N.S.W. Division

W. G. Ryan, Secretary, VK2TI, Box 1734 JJ, G.P.O., Sydney.

Country Zone Officers.

Zone 1 (Far West).—J. Perooz, VK2PE, Hope Street, Bourke.

Zone 2 (North-West).—H. Hutton, VK2HV, Byron Street, Inverell.

Zone 3 (North Coast).—R. J. Berry, VK2NY, 54 Bacon Street, Grafton.

Zone 4 (Hunter River and Coalfields).— R. W. Best, VK2TY, 57 Hunter Street, Newcastle.

Zone 5 (South Coast and South-West).—R. Ross, VK2IG, 673 David Street, Albury.

W.I.A. CHARTER.

After negotiations extending over a lengthy period, during which time certain legal difficulties were overcome, the Division has now taken over the original Certificate of Incorporation of the W.I.A. of New South Wales, so that the Divisions full title is now the Wireless Institue of Australia (N.S.W. Division) Incorporated.

This means that we have the full rights and powers of the original W.I.A., being recognised as a properly constituted organisation.

JUNE GENERAL MEETING.

At the general meeting held on June 17th we were privileged to hear a very interesting talk on the subject of "Modulation and its Associated Problems" by Mr. J. G. Reed, VK2JR, the engineer responsible for the design and erection of the recently completed 60KW broadcast station at Wellington, N.Z.

Mr. Reed's lecture, the subject matter of which is presented elsewhere in this issue, dealt mainly with the problem of overmodulation and methods for its detection. The subject was presented in an entertaining manner, much appreciated by those present, and the information given should prove of great value, especially to the 'phone men.

JULY GENERAL MEETING.

At this meeting Mr. R. Chilton, VK2RC gave an interesting lecture under the title "A Synopsis of Valve Operating Conditions as applied to Performance and Life". He mentioned particularly the phenomenon of "contact potential" particularly as effecting receiving valves designed to operate with low values of grid bias, and also the effects of grid emission in power valves and transmitting valves.

Several of the points mentioned by Mr. Chilton formed the subject for interesting discussion by those present indicating the interest taken in the lecture.

U.H.F. ACTIVITY.

The U.H.F. Section of the Division proposes to hold regular 56 mc. Tests on the last Sunday of each month by doing this it is hoped that something more definite will be achieved in the near future, as only through widespread and continued interest can we hope for success, particularly with regard to DX on this band. The U.H.F. Section notes deal with this more fully.

ZONE 5 NOTES.

VK2IG.

Patchy conditions have maintained on all bands this last month

the 40 metres is showing a slight improvement. On 20 Europe easiest to raise during the early P.M.'s with W's heard on 10 most of the day.

20J is rather quiet has new fone going OK after having (he reckons) had every fone ailment possible.

2QE putting in electron coupled 6H6G so also not on much. Talks of going five metres.

2AFD hopes to have rig going about a week on qrp.

2EU raising the DX on forty. Also has fone in, es fb reports from the locals. Had trouble in neutralizing the final and found he was over driving it.

2IG on 20 only. New super FB with iron cored var-selectivity IFT installed QSO'd PK6 es 1KZ for new ones. Remodelling xmitter.

All stations here having much trouble from motor qrm and also from commercial giving plane reports on fone and this is helping to keep 'em quiet.

LAKEMBA RADIO CLUB—VK2LR.

B 2DL.

Members of the above club last month conducted experimental transmissions from the Kogarah district on the occasion of the official opening of the trolley bus service in that area. The control station was situated near the official stand, while portable equipment was fitted to cars which moved with the procession. The Mayor of Kogarah, Ald. J. C. Battye, gave his fullest support to the experiments.

A further interesting transmission took place between the Enmore Activity School and the Manly Intermediate High School. The transmitter at Manly was operated by Mr. E. P. Hodgkins (President, Lakemba Club) VK2EH, and that at Manly by Mr. E. Treharne, VK2AFQ. Speeches greetings and messages of a similar nature were exchanged between the two schools, in the presence of the Director of Education, Mr. Ross Thomas.

The transmissions proved very popular with the boys, and efforts to introduce radio to them as a hobby, is to be highly commended. It is understood that the pupils at Enmore school are very enthusiastic regarding radio, as they receive a lot of useful information from their teacher, VK2EH.

Two more of our members sat for the last A.O.P.C. exam, including the Secretary Mr. G. Brown. It is rumoured that a special prize is to be given to the member who constitutes the 50th licensed transmitting member of the club.

WAVERLEY RADIO CLUB.

Several very interesting demonstrations of gear have taken place at the Club meetings recently. On June 22nd, our President, Mr. G. Wells, delivered a lecture on the uses of the cathode ray tube, illustrated by his oscilloscope, which incidentally won a prize at the recent W.I.A. Exhibition. At the next meeting Mr. Wells brought along an audio amplifier and pick-up, and entertained members with some high fidelity reproduction—the boys being particularly intrigued with the speaker cone hopping about half an inch on the 50 cycle notes.

A "frequency run" on 2ABS' Modulator was the feature of the next meeting, and was accomplished by measuring the output with a vacuum tube voltometer, while a standard frequency record and crystal pick-up were connected to the input. The most surprising result of the test was the amazing output of the pick-up on the low frequencies—as much as 6 volts output was measured at 50 cycles. At the conclusion, a frequency response curve was drawn by Mr. Lusby (VK2WN) and 2ABS was quite elated at the appearance of same. The output wave form was also viewed on the screen of Mr. Wells' oscilloscope and strange but true was an almost perfect sine wave.

More interesting demonstrations are to follow and anyone interested is invited to drop in any Tuesday evening at 8 p.m.

Two of our most enthusiastic members, A. Pearce and G. Patterson sat for their "tickets" on July 13th, but despite unlucky numbers we hope to add two more hams to our collection —good luck boys.

LOCAL CHATTER.

2EG is at present pursuing the Europeans on 14 mc every Sunday afternoon—don't despair, Dev.

2FK has decided to give the foreign listeners a thrill by going back on the air again.

2AFZ looks very pleased. Maybe it's because his rig has quit its antics and is working fb now.

2AFG now makes a big racket around these parts with an AL3 final and two 50 ft sticks. Passers-by take one glance at the impressive array of guy wires and think it is VIS!

2ABS has just built a nice new 9 valve superhet with every modern convenience except hot and cold water laid on, and now can hear every electric motor in Bondi, but not much dx.

2QM has obtained his 1st class ticket—congratulations. Cec.

2FJ is warming his 211s on 14 mc fone these days. He should be closer to W than anybody else in Sydney, because his QRA is right on the edge of the big pond.

Victorian Division

PHONE SECTION
by J. Kling 3JB

It was with great regret that during the month of June the passing of one of our fellow members was recorded. His sudden death was felt by all members of the fone section, who honoured him by appropriate announcements followed by a period of silence during all 200 metre transmissions on Sunday, June 13th.

The fone section meeting for June was well attended at the Institute Rooms even though the temperature was nearing freezing point and many of the members were suffering from colds.

After a silent tribute to the late Mr. Ern. Kilborn, the election of office bearer's of the fone section for the next year took place. The respective positions of Chairman, Secretary and Asst. Secretary are now held by W. Sievers (VK3CB) A. L. Johnson (VK3FL) and Mr. Clarke of (VK3RI).

Mr. G. Thompson (VK3TH), who has held the position of Chairman for many years, although nominated for the chair again this year, expressed the desire to relinquish this duty owing to the pressure of business from other sections of the Institute, it is pleasing however that he has offered to assist during the meetings. Members of the allocations committee for the period are Messrs. Kerley, Hansen and Doyle (VK3CR). Members of the gang were pleased that our friend Mr. Doyle is now able to assist with the allocations committee, and as he is now residing for a while at Long Island Frankston we will no doubt be having some useful reports from him. Apparently the sea air has improved his health and it is hoped he will be able to attend some of the meetings in person in the near future. A special test for New Zealand dxers was held on the first Sunday in July and practically all metropolitan stations were to be heard for an hour during the late night session.

MALLEE AND NORTHERN DISTRICT.
(3ZK—3HX).

Sorry gang that no notes appeared last month, but as they just didn't well? However we hope that it will not occur again.

Conditions in this part of the state have not been at all bright, in fact they have been bad owing possibly to the unsettled weather and the continued unbroken line of frosts, with the advent of a break and some rain conditions should improve. On 20 metres the conditions have been patchy and then very little coming through. On 40 metres skip seems to be prevailing and mostly only interstate stations are coming through. On 80 metres a background of noise has been existing but in spite of that many stations are coming in very well particularly the ZL's 4AT, 2JO, 2BT, 2BE, 2MK and 3IF heard as early as 5 p.m. on this band being the best, Yanks have been lately.

3KR still continues to work W6BKY on 20 metres with wonderful success, and Ken is very pleased with his V beam which he has raised to the top of his 80 ft stick. Ken believes in comfort having installed remote control to the fireside; in fact he almost refuses to leave the fire for the mike when visiting.

3OR is not particularly active since his return home, but makes an ap-

pearance occasionally on 80 Murray has been troubled with generator hum but has nearly got rid of it with a couple of condensers.

3TL has been trying to improve his modulation and has succeeded to a certain extent, Treb is not satisfied however and will probably get it going before long.

3CE has been troubled with a new speech amp for some time and in spite of various ideas it refuses to perk in a satisfactory manner Roy has not been very active owing to cropping but as soon as that is finished he will be on 20 mx.

3WN is heard on 80 occasionally with very nice fone, but Jack is not very active.

3HN will make a comeback shortly is in his new shack, but had the misfortune to burn out his 400 v generator. .

3NN is not very active but Herb makes an appearance on Sunday morning skeds.

3EP has at long last obtained the YF's permission to install the gear beside the fire, which Ted has with excellent results. He had to lengthen his feeders to do the job, but he still comes in like a ton of bricks, quality very good except for a slight echo effect.

3TS and 3FF having got their generator working and the rigs chirping are now installing fone on one of the rigs. 3TS Tom took Yankie land by storm and how.

3IH has been active on 80 m.x fone plate modulating a 6P6 with good results.

3KI is heard occasionally with r9 fone but the quality?

3BM has been missing where Bruce?

3ZK in spite of rumors to the effect that he is frightened to come on the air makes frequent appearances. Jim is very QRL.

3HX is at the moment stationed on 80 mx and is endeavouring to get some quality from his speech amp. Tom understands that something is due to happen so he is just waiting.

THE DOINGS OF THE BOYS IN GIPPSLAND.

By 3DG and 3WE.

VK3IL.—Gabo Island Lighthouse on 7 mc with very chirpy sig using MOPA, power supply genemotor power input 5 watts. Boys give Bob a shout if you have a few hours to put in as he has time on his hands down there.

VK3LY.—Ron puts out fb fone on 7 mc when not on duty at local broadcast station, on chiefly of a morning and afternoon until four o'clock, and late at night. Sigs fb and R7 reports from W on fone. Line up something like this 42 Xtal Osc 6L6 doub and pair of 10's in final modulation equipment 57, 56, 42 feeding pair 6B5's in push pull with Heising modulation.

VK3GO.—Has just shifted to new qra and expects to have new ant erected soon a Zepp. At present on 7 mc with TNT using 45es qrp and is not heard very much.

VK3BR.—Not on air very busy selling radio and has the VK4 Bug biting him hopes to make a trip up there very soon, if unable to, will come back with qro as the AC has now be laid on to the town.

VK3QB.—Just returned from holidays with a load of gear and can be heard on 3.5 mc using a 802 in a tritet xtal rig with a fb T9 note. Jack has worked a couple of ZI's and is getting out nicely.

VK3SS.—Keith has had the misfortune to fracture a couple of xtals tuning up his rig which we believe is at present a 6P6 xtal osc. Has very little time to spare as service work keeps him honest.

VK3DG.—Is at present on 80 mx cw with qrp using a 53 xtal osc and a 6P6 pa wid 3 to 6 watts input. Hopes to have power pack reconstructed soon and is going to try fone.

VK3DI.—On 80 mx fone with suppressor grid modulation es qrp Hopos to give 28 mc a try later when he gets recr to work satisfactory down there.

3PR.—Still on QRP phone with sup mod. 6P6 and vibrator power supply and still hoping for AC power supply. Nevertheless puts phone into ZL with 5 watts or less.

3WE.—Well listen on 40, 80, or 234 at due hours and the "Old Man of the Mountains" is sure to be there Even when Omeo temperature hits 14 deg. there's nothing frostbitten about Bills sig.

Strays.—3ZK otherwise "Stripey James" was on a Pub. Address Job recently when a snappy YL passed Jimmy turned round, tripped over the amplifier and wrecked it, besides barking his shins and skinning his nose.

Noted that a certain station on the Avoca, who wailed about duplex last year, now works little else—accompanied by Sunday feedbackers and extraneous noises—what say Tommy?

Queensland Division

Results of Five Metre Tests Communication Established Between Brisbane and Toowoomba.

On account of the fact that no news has come to hand from the Southern States or New Zealand it is perhaps a little early to judge the final results of the field day held by the Wireless Institute of Australia Divisions on Sunday, 27th June. At this writing we are, however, forced to the conclusion that as a result of the Field Day Queensland amateurs are now more five metre minded than ever before.

All told the day was a great success. Much interesting data was collected and the effectiveness of height in ultra high frequency propagation was amply demonstrated.

The most outstanding performance went to 4HR, stationed at Mt. Gravatt, and 4CG, Toowoomba, who maintained excellent voice communication across the intervening distance of approximately 70 miles for well over an hour. This communication represents a land station record for five metre stations in Queensland and looks like standing for some time.

4HR's log reads as follows: 80I in a split hartley circuit; 6 volts on filament and 230 on plate. A 42 used as modulator with P.M.G. mike. Receiver of the self-quenched type using 76 and 42. A vertical half-wave copper rod proved the best among many aerials tried for transmission. 50 feet of wire 15 feet high served for reception. 4WI on the

motor vessel "Mirimar" was held all the way across Moreton Bay until it berthed at Amity Point. 4LX, 4RY and 4AW were all QSO'd at good strength. 4CG, Toowoomba was worked and held for about 1½ hours, the signal strength of the Toowoomba station being around R6 to 7. A harmonic from commercial station FZN was heard and a weak station playing gramophone records which was thought to be 4CU of Clifton.

Other field stations participating included 4WI, Amity Point, 4RY, Mt. Cootha, and 4WT, Mt. Nebo. 4LX, 4AW and 4AP operated from their home QRA's.

Another Field Day will no doubt be held on the first Sunday in August and by the time these notes appear in print country members interested in 'five" will have received full details of the arrangements.

PERSONAL ITEMS.

The first xtal controlled 3 way contact on "five" was effected recently by 4AW, 4RY and 4AP.

Congrats to 4RY for winning the Division's Cup for the best all round station in Queensland.

4HR iis busy rebuilding his five metre gear. "Tibby" must think his five metre record wants extending.

4UR is waiting for 4JX to finish his ten tube super. Have patience O.M. It will make a nice Xmas Box.

4PR has divorced radio and gone in for motor cycling.

4GK and 4YL are pretty quiet these days.

4RF, 4SD and 4EL are about the most consistent DX chasers at the moment.

4LX wants to know the best method of feeding a Bruce antenna Can any one oblige.

4AP finds more interest in the speedometer and revolution counter of a Riley 9 than in radio dials just at present.

4OL must be in hding. Haven't seen or heard of him for weeks.

4FB and 4GU still find time to play a bright record or two on Sundays.

4JX and 4JU our QRO fone men have arranged a secret treaty. Very commendable O.M.'s.

4WT is now an enthusiastic five metre fan. Bet Bill will at least have a high polish on the gear.

4RG is keen on making fone WAC on 14 mc. Think that the African QSO will mean many late nights.

4KH is building his seventh superhet RX. Soon the Club will be holding a guessing competition to see how many supers the "old commercialop" has built.

Tasmanian Division

The usual monthly meeting was held in the Y.M.C.A. Rooms, Liverpool Street, Hobart on July 1st and the attendance was rather poor, due no doubt to the very cold night, one is rather tempted to remain indoors when the weather is unpleasant. The Lecture was delivered by Mr. H. Moorhouse VK7HM and his subject was "Transmitter Construction." Did some one say a fire in the room would be appreciated? I hope the Council will take heed and not let us freeze next meeting night.

The Fisk Trophy, 80 metre phone, VK-ZL and not forgetting the National Field Day are causing the active hams in VK7 to sit up and take notice, we expect to muster a large team this year, so look out. Arrangements are now being finalised for the Southern Members and Northern Members to try and place VK7 first if possible.

We welcome to the Institute the following new members, VK7LC (Lloyd Chappell) of Ross, in the short time he has been on the air he has worked nearly all continents VK7WJ (J. Lithgow) Tarraleah, we have not heard from him over the air, very busy getting ready VK7's great hydro electric scheme. VK7HY (Henry Yeates) Launceston Henry was very pleased with his visit to VIH and will be sure to be at the next Annual Dinner, and finally Bruce H. Brown of Launceston Bruce has not yet had his call sign allotted, but we hope he will be on the air very shortly.

We are making an appeal to all non members to join the Institute there are several still outside the fold, the cost is small and the benefits are many, write to the Divisional Secretary for particulars. Members should help to get new members, help us to help you, join the Institute.

(Continued on Page 28)

R.A.A.F. Wireless Reserve Notes

Officer Commanding: Flying Officer R. H. Cunningham, 397 High Street, Glen Iris, S.E.6, Victoria (VK3ML).

District Commanders—

Second District, N.S.W.—A. G. Henry, Clareville Avenue, Sandringham (VK2ZK).

Third District, Victoria—Pilot Officer V. E. Marshall, 3 Myrtle Avenue, Kew (VK3UK).

Fourth District, Queensland—A. E. Walz, Sandgate Road, Nundah (VK4AW).

Fifth District, South Australia—F. M. Gray, 52 Ormond Grove, Toorak Gardens (VK5SU).

Sixth District, West Australia—J. Mead, 111 Gerrard St., East Victoria Park, W.A. (VK6LJ)

Seventh District, Tasmania—R. Cannon, Goldie Street, Wynyard (VK7RC).

RESERVE NOTES.—3rd District.
VK3UK—3ZI.

Conditions, whilst much better than they have been, still remain patchy on 3.5 mc. In particular the signals from the Western District boys nearly always are subject to bad fading. 3B5 has a fade out from R6/7 every three or four seconds on most Sundays but strangely enough 3C4 who used to invariably be weak and fade badly here, now puts in a steady R6 signal. Possibly his alterations to antenna and gear are partly responsible.

3B5 and 3B2 ran a 56mc test early in the month with the latter operating from home and the former with his 56mc super het cruising around in the car. Signals were a good R6 at ten miles even with a few big hills in the way so they have plenty of encouragement to continue the good work. 3D4 is active on 56mc and 3D6 is altering the 56mc gear preparatory to carrying on further experimental work on the band.

3D3 is still having trouble with his power supply equipment. The wind driven charger has been unable to do its stuff this month as there has been an almost total absence of the necessary wind. As a result his batteries are flat. He has hopes of the connection of AC shortly and his troubles from a recharging point of view will be no more.

3C4 hopes to be down in the city shortly and we hope he will have more time available for radio than usual. Most of the country men have so many things to attend to on their all too brief trips to the city that the time available for radio is usually very small.

3C3 and 3F9 are very quiet at present but we suppose that they are busy getting their 56 mc gear ready for the forthcoming tests with Melbourne.

3A1 is still away from the city as much as ever.

3A4 has resigned from active work for twelve months as he will shortly be leaving for England for an extended stay. We wish him the best of luck and hope we may be able to QSO from one of the G's sometime.

3A2 has also been forced to resign owing to the pressure of exams and he also may be leaving VMC soon. Geoff has been one of the best Section Leaders we have ever had and he will be greatly missed from that position. We all wish him the best of luck with those exams.

3WD at Ballarat is a new member we wish to welcome to the fold. He is at 3BA with 3AL who was one of our enthusiastic old timers. If he can follow in the latter's footsteps he will indeed be an acquisition to VMC. It is with the greatest regret that we learned of the death of 3B2's Mother and we extend to Neil on behalf of all members our deepest sympathy.

Sixth District.

The consideration for the army station G71 has been brought up once again and the matter may be brought to a head in the near future. 6A6 has resumed watch attendance

once again after settling down in business in South Perth. 6B1 has erected a new 80 foot lattice mast and complains of much DX! 6A5, one of the most reliable stations still appears on the band for each watch. 6A1 will be on watch without the signal manual but will be more or less OK for one from 6Z1 who will be shifting in a week or two to a new qra (we believe that it is known as DX valley-1A1!) Otherwise VMF District is awaiting new members stationery from Air Board. 6BI is now stationed on B/C work at 6BM.

(Continued from page 25)

We regret very much to learn of the death of Mr. E. H. Kilborn VK3KE who ably distributed the Magazine, members of this Division offer their sincere sympathy to the family of Mr. Kilborn.

MEMBERS ACTIVITIES.

VK7.

7YL very busy helping Buck (7JB) with the 200 metre transmissions not heard much on CW lately, what about that sked with 7HM. Joy?

7CT suffering with YLitis very bad, when are you coming on the air Terry?

7DW Bunny still waiting to get power supplies big enough to get 25 watts inputt, what happened to that 250 watt job?

7KV still dabbling in 5 metres, getting R max from 7KQ (Gil Miles) at a distance of 100 yards.

7DJ we are anxiously waiting to hear you on the air John, what is the delay.?

7LJ still entertains BCL's on 200 metres, has a sked with 3CN every Friday night, University and the new second operator taking all his time.

7JH still at Waddamana, they say it is cold up there Jack, 20 degree's below freezing point.

7PA on the move so will not hear his Sunday transmissions for a month or so, the BCL's will miss you Peter.

7AH the Grand Old Man of Radio is back once again with us and every member is very pleased to see you Pop after your illness, may you be spared many more years with us.

7MM we are pleased to know Mr. Masters is again active on the air, has a sked with 3CN every week.

7BQ one of the early experimenters in VK7 is always to be found on Sundays entertaining BCL's his record library is the envy of all hams.

7JB Buck find the ham game has not enough thrills so has taken up footballing, how did you get on in Launceston the other week end Buck, did you play contact at the Hotel?

7AL Tommy Allen (7PA's brother) has just got his license although he got his ticket last year, been second operator at 7PA for a long time.

7AB the 'Stutes representative in Launceston, very busy at present arrangeing a team for the forthcoming contests. Keep up the good work Doug.

7LZ, 7KR, 7RK, 7CJ, 7RY, 7RC, 7AM, 7CL, 7CK, 7HM, 7DH, 7CM and the rest of the gang are not forgotten but space will not permit mention It will be your turn next month. The Magazine Correspondent (7KV) will appreciate any item of interest for inclusion in this column.

Hamads

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BRIGHT STAR RADIO, VK3UH, 517 Lower Malvern road, Glen Iris, S.E.6. Crystals ground from best Brazilian Quartz and tested to 50 watts input to penthode oscillator, as used by leading experimenters and DX Stations, accuracy plus or minus 3 KC's, 200, 160 metre, 15/-; 80 metre, 10/-; 40 metre, £1/5/-; 465 KC, xtal gates, £2; Plug-in type holders, 7/6 each. Power Transformers constructed to specifications. Filament transformers, up to six windings, 15/6. Receivers and Transmitters constructed. Super-Hets aligned. Triad first quality 866 Mercury Vapour Rectifiers, 7500 volts peak, £1/1/-. National Type, N dials, £2 each. Taylor T55 Triode Transmitting Tubes, 55 watts plate dissipation, 170 watts RF output on all frequencies up to 30 MC's. meters repaired. Wanted — Small rotary converter, about 110 D.C. to Price, £4/4/- each. All types of metres repaired. Call or write above address. Phone U1218. Satisfaction guaranteed.

XTALS by W9ADN, 80 at £1; 40 BT £1; RF Chokes by ON4DJ, 10/200 MX 175 MA, 2/9. 5MX, 1/11. BUGS, as Vibro, steel base, 35/-. KEYS, as P.O, nickel-plated, 15/-. VK3RJ, 23 Landale St., Box Hill, Vic.

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